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The Value of Commercial Vaccines and Bacterins Against Fowl Cholera

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THE VALUE OF COMMERCIAL VACCINES AND BACTERINS AGAINST FOWL CHOLERA

By

L. VAN ES AND H. M. MARTIN

A great prevalence of the disease known as fowl cholera has naturally stimulated an interest in possible means of prevention and especially in those which may bring about a more or less lasting immunity. Attempts at immunizing against this disease date back to the very beginning of the era of modern bacteriology and immunology, and there is no doubt that many investigators succeeded in causing immunity in chickens by one method or other. Apparently, however, it has not yet been possible thru any of those methods to gain a solid footing and general dependability. Vaccines which were favorably reported by some failed utterly in the hands of others, so that on the whole no substantial advantage has been gained.

Vaccines and bacterins are nevertheless constantly urged on poultry owners confronted with disease and the Experiment Station is frequently called upon to give an opinion on their value or to recommend any special preparation.

In order to comply with those demands in an intelligent and impartial manner, we have thought it wise to make some experiments with the various preparations offered by the pharmaceutical trade in the hope that this may enable us to recommend all or any preparation for the relief of our poultry raisers.

A search through the advertising pages of veterinary journals showed that in all six manufacturers offered vaccines and bacterins against fowl cholera for sale and claimed for them immunizing powers sufficient to warrant the expenditure of money on the part of poultry producers.

From those various manufacturers we purchased a quantity of their products, treated a given number of fowls with them and then tested the immunity of the latter by means of inoculations with fowl cholera organisms secured from field outbreaks and cultivated in our laboratory.

We hereby submit the details of those experiments in the following tables.

SAMPLE NO. 148.

This preparation was sold to us as "Hemorrhagic Septicemia Vaccine (Avian)." The details of the tests of this material are given in Table I.

TABLE I

Chicken No.	Fowl cholera vaccine No. 148 2/3 Quantity 1 c.c.	One loopful culture B. bipolaris avisepticus 2/11 Strain 38 B.	Dates of deaths	Remarks
1.....	—	X	2/12	All chickens were very sick the day after the virus injection.
2.....	—	X	2/14	
3.....	X	X	2/14	
4.....	X	X	2/13	
5.....	X	X	....	Very sick. Recovered
6.....	X	X	2/23	
7.....	X	X	2/17	
8.....	X	X	2/13	
9.....	X	X	....	Very sick. Recovered
10.....	X	X	2/15	
11.....	X	X	....	Very sick. Recovered
12.....	X	X	2/15	

NOTE—The fact that an injection was made is indicated by the X. A dash (—) is used to show that no injection took place.

SAMPLE No. 618. A specimen of "Hemorrhagic Septicemia Combined Bacterin (Avian)." The results of the test are contained in Table II.

TABLE II

Chicken No.	Injections bacterin No. 618 2/7	Injections bacterin No. 618 2/12	Injections of virus No. 623 2/21	Injections of virus No. 637 4/8	Dates of deaths	Remarks
1.....	½ c.c.	½ c.c.	X	—	3/1	Lame and sick on 2/24
2.....	½ c.c.	½ c.c.	X	X	—	Became sick after first virus. Recovered, sickened again after second virus injection. Destroyed 4/12. Very sick.
3.....	½ c.c.	½ c.c.	X	—	3/4	Very sick on 2/24
4.....	½ c.c.	½ c.c.	X	—	3/2	Sick on 2/24
5.....	½ c.c.	½ c.c.	X	—	2/28	Very sick on 2/24
6.....	½ c.c.	½ c.c.	X	—	2/23	
7.....	½ c.c.	½ c.c.	X	—	3/13	Very sick on 2/24
8.....	½ c.c.	½ c.c.	X	—	2/24	
9.....	½ c.c.	½ c.c.	X	—	—	This subject became very sick 4/29 and remained so until it was destroyed 4/12.
10.....	½ c.c.	½ c.c.	X	—	3/1	Very sick on 2/24
11.....	1 c.c.	2 c.c.	X	—	2/26	Very sick on 2/24
12.....	1 c.c.	2 c.c.	X	X	—	Sick on 2/24 and was still very sick when second dose of virus was given. Killed 2/12.
13.....	1 c.c.	2 c.c.	X	X	—	Sick on 2/24. Had not quite recovered when second virus injection was made. Killed 4/12. May have recovered..
14.....	1 c.c.	2 c.c.	X	—	2/27	Sick on 2/24
15.....	1 c.c.	2 c.c.	X	—	2/26	Very sick on 2/24
16.....	1 c.c.	2 c.c.	X	—	3/14	Sick on 2/24
17.....	1 c.c.	2 c.c.	X	—	2/29	Sick and lame on 2/24
18.....	1 c.c.	2 c.c.	X	—	2/29	Very sick 2/24
19.....	1 c.c.	2 c.c.	X	—	3/2	Sick and lame 2/24
20.....	1 c.c.	2 c.c.	X	—	3/30	2/24. The autopsy showed large necrotic foci in region of sternum which contained many bipolar organisms.
21.....	—	—	X	—	2/26	Virus control
22.....	—	—	X	—	2/26	Virus control
23.....	—	—	X	—	2/23	Virus control
24.....	—	—	X	—	2/23	Virus control

Belonging to this same series are the six fowls of Table III which fifteen days after the last regular bacterin dose received 10 c.c. of the same substance. This was done in order to learn if any anaphylaxis may occur and also because we wished to learn whether or not protection against actual disease may be secured through the use of extra large doses. What happened to those chickens, when called upon to prove their immunity may be found in Table III.

TABLE III

Chicken No.	Injection bacterin No. 618			Injection B. bipolaris No. 637 3/8	Injection B. bipolaris No. 637 4/8	Dates of deaths	Remarks
	½ c.c. 2/7	½ c.c. 2/12	10 c.c. 2/27				
1	X	X	X	X	X	—	The 10 c.c. bacterin dose caused a transitory weakness. The fowl was sick 3/15 but recovered. Sec. virus injection no results.
2	X	X	X	X	—	3/16	Transitory weakness after last bacterin injection. Sick on 3/21.
3	X	X	X	X	—	3/14	Ditto. Sick 3/10.
4	X	X	X	X	—	3/12	Ditto. Sick and lame 3/10.
5	X	X	X	X	—	3/16	Ditto. Sick on 3/10.
6	X	X	X	X	X		Sick and lame on 3/10. When killed still sick on 4/12. Weakness after 10 c.c. bacterin injection.

Sample No. 630.

A preparation labelled: "Avian Hemorrhagic Septicemia Bacterin." (Table IV.)

TABLE IV

Chicken No.	Injections bacterin No. 630			Injections B. bipolaris No. 637		Dates of deaths	Remarks
	2/21	2/24	2/27	3/8	4/8		
1.....	2 c.c.	2 c.c.	2 c.c.	X	—	3/10	
2.....	2 c.c.	2 c.c.	2 c.c.	X	—	3/10	
3.....	2 c.c.	2 c.c.	2 c.c.	X	—	3/9	
4.....	2 c.c.	2 c.c.	2 c.c.	X	X	4/12	Chicken was still sick when killed.
5.....	2 c.c.	2 c.c.	2 c.c.	X	X	3/10	
6.....	2 c.c.	2 c.c.	2 c.c.	X	X	4/12	Sick 3/11. Was moribund when killed.
7.....	2 c.c.	2 c.c.	2 c.c.	X	X	4/12	Sick 3/11. In very poor condition when killed.
8.....	4 c.c.	2 c.c.	2 c.c.	X	—	3/9	
9.....	2 c.c.	2 c.c.	2 c.c.	X	—	3/10	
10.....	2 c.c.	2 c.c.	2 c.c.	X	—	3/9	
11.....	2 c.c.	2 c.c.	2 c.c.	X	—	3/14	Sick on 3/11.
12.....	2 c.c.	2 c.c.	2 c.c.	X	—	3/12	Sick on 3/11.
13.....	2 c.c.	2 c.c.	2 c.c.	X	—	3/19	
14.....	2 c.c.	2 c.c.	2 c.c.	X	—	3/10	
15.....	2 c.c.	2 c.c.	2 c.c.	X	—	3/9	
16.....	—	—	—	X	—	3/10	
17.....	—	—	—	X	—	3/9	
18.....	—	—	—	X	—	3/11	
19.....	—	—	—	X	—	3/9	
20.....	—	—	—	X	—	3/13	

SAMPLE No. 676.

Sold under the label of: "Avisepticus Bacterin." (Table V.)

TABLE V

Chicken No.	Injection bacterin No. 676 2 c.c.			Injection B. bipolaris No. 673 1 loopful 3/30	Dates of deaths	Remarks
	3/12	3/15	3/18			
1.....	X	X	X	X	3/21	
2.....	X	X	X	X	4/3	Sick on 3/31
3.....	X	X	X	X	4/3	Sick on 3/31
4.....	X	X	X	X	4/2	Sick on 3/31
5.....	X	X	X	X	4/1	
6.....	X	X	X	X	4/4	Sick on 3/31
7.....	X	X	X	X	4/12	Killed. Chronic cholera. Sick on 3/31
8.....	X	X	X	X	4/12	Killed — in good health had not been sick
9.....	X	X	X	X	4/12	Sick on 3/31. Very sick when killed
10.....	X	X	X	X	4/6	Sick on 3/31
11.....	X	X	X	X	4/3	Sick on 3/31
12.....	X	X	X	X	4/1	Sick on 3/31
13.....	X	X	X	X	4/5	Sick on 3/31
14.....	X	X	X	X	4/8	Sick on 3/31
15.....	X	X	X	X	4/12	Killed. Sick on 3/31. Developed chronic cholera
16.....	—	—	—	X	4/1	Control
17.....	—	—	—	X	4/1	Control
18.....	—	—	—	X	3/31	Control
19.....	—	—	—	X	4/1	Control
20.....	—	—	—	X	3/31	Control
21.....	—	—	—	X	4/1	Control
22.....	—	—	—	X	4/1	Control
23.....	—	—	—	X	3/31	Control
24.....	—	—	X	X	3/31	Control
25.....	—	—	—	X	4/3	Control. Sick on 3/31
26.....	—	—	—	X	4/1	Control
27.....	—	—	—	X	3/31	Control

SAMPLE No. 682.

A preparation labelled: "Hemorrhagic Septicemia Vaccine (for fowls)." (Table VI.)

TABLE VI

Chicken No.	Injections vaccine No. 682 2 c.c. 3/17	3/20	3/23	Injections B. bipolaris No. 637 1 loopful 3/30	Dates of deaths	Remarks
1.....	—	—	—	X	4/1	Control
2.....	—	—	—	X	4/8	Control. Sick on 3/31
3.....	X	X	X	X	4/7	Sick on 3/31
4.....	X	X	X	X	4/4	Sick on 3/31
5.....	X	X	X	X	4/3	Sick on 3/31
6.....	X	X	X	X	3/31	
7.....	X	X	X	X	3/31	
8.....	X	X	X	X	3/31	
9.....	X	X	X	X	4/1	
10.....	X	X	X	..	3/31	
11.....	X	X	X	X	4/1	
12.....	X	X	X	X	4/3	Sick on 3/31
13.....	X	X	X	X	3/31	
14.....	X	X	X	X	3/31	
15.....	X	X	X	X	4/11	Sick on 3/31
16.....	X	X	X	X	4/9	Sick on 3/31
17.....	X	X	X	X	3/31	
18.....	X	X	X	X	4/8	Sick on 3/31
19.....	—	—	—	X	4/2	Sick on 3/31. Control
20.....	—	—	—	X	4/1	Control
21.....	—	—	—	X	3/31	Control
22.....	—	—	—	X	3/31	Control
23.....	—	—	—	X	3/31	Control
24.....	—	—	—	X	3/31	Control
25.....	—	—	—	X	4/10	Sick on 3/31. Control
26.....	—	—	—	X	4/12	Sick on 3/31. Control Recovering when killed
27.....	—	—	—	X	4/1	Control
28.....	—	—	—	X	3/31	Control
29.....	—	—	—	X	3/31	Control

Sample No. 741.

A product sold as: "Fowl Cholera Bacterin." (Table VII.)

TABLE VII

Chicken No.	Injections bacterin No. 741. c.c. 4/19	4/22	4/25	Injections B. bipolaris No. 637 1 loopful 5/7	Dates of deaths	Remarks
1.....	1	1	1	1	5/18	Sick 5/10. Very sick when killed
2.....	1	1	1	1/10	5/12	Sick 5/10
3.....	1	1	1	1	5/8	
4.....	1	1	1	1	5/18	Very sick when killed
5.....	1	1	1	1/10	5/14	Sick on 5/10
6.....	—	1	1	1	5/12	
7.....	—	1	1	1	5/11	
8.....	—	1	1	1	5/13	
9.....	—	1	1	1/10	5/8	
10.....	—	1	1	1	5/13	
11.....	—	—	1	1	5/10	
12.....	—	—	1	1/10	5/8	
13.....	—	—	2	1	5/18	Sick 5/10. Very sick when killed
14.....	—	—	1	1	5/18	Sick 5/10. Very sick when killed
15.....	—	—	1	1	5/9	
16.....	—	—	1	1	5/18	Sick 5/10. Apparently recovered when killed Necrosis at point of inoculation. Many organisms present.
17.....	—	—	—	1/10	5/9	Control
18.....	—	—	—	1/10	5/9	Control
19.....	—	—	—	1/10	5/9	Control
20.....	—	—	—	1/10	5/9	Control
21.....	—	—	—	1	5/11	Control
22.....	—	—	—	1	5/9	Control
23.....	—	—	—	1	5/9	Control
24.....	—	—	—	1	5/11	Control
25.....	—	—	—	1	5/8	Control
26.....	—	—	—	1	5/8	Control
27.....	—	—	—	1	5/9	Control
28.....	—	—	—	1	5/9	Control
29.....	—	—	—	1	5/8	Control
30.....	—	—	—	1	5/10	Control
31.....	—	—	—	1	5/10	Control

Summarizing the results of the preceding series, we find as follows: (Table VIII.)

TABLE VIII

Number of chickens of which immunity was tested	Number of bacterin or vaccine injections	Results	
		Chickens sick or dead	Chickens immune
18	1	18	0
25	2	25	0
57	3	56	1
100	..	99	1

It is evident from the above that no reliance can be placed on the vaccines and bacterins against fowl cholera, which we are able to find on the market and subject to definite tests. We have no doubt as to the possibility of artificial immunity as an aid to the control of fowl cholera, but as yet we will have to get along with the more non specific means of prevention, even if those are far from a universal efficiency.